Cuyahoga Sustainability Network

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Allen Bradley	**IIHR Hydroscience & Engineering** **University of Iowa**
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Terry Schwarz	**Cleveland Urban Design Collaborative** **Kent State University**

Contributions to Sustainable Decision Making:

Fill Key Information Needs to Foster and Support Sustainable Land Transformation Decision-Making

- **Landscape Influences on Environmental Services**
- **Urban Hydrology and Sustainable Landscapes**
- **Economic Demand for Environmentally Sustainable Design**
- **Multiobjective Decision Making**

This research is funded by
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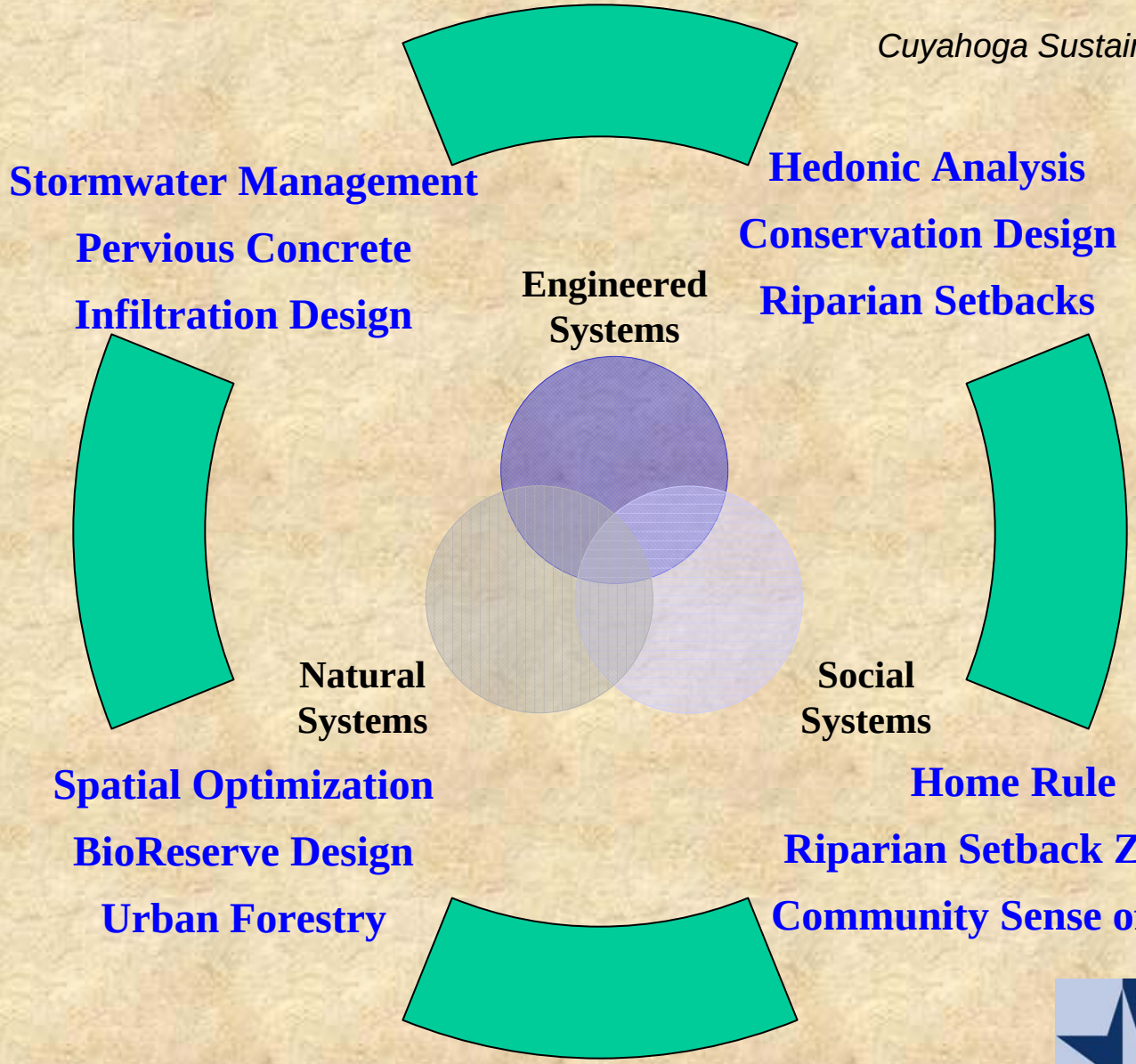
Grant # X3-832305

Cuyahoga Sustainability Network



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Surprising Results:

- **Suburban History - Ghosts of Landuse Past**
- **Pervious Runoff**
- **Planning & Development in a Home Rule State**
- **Hedonic Analysis – Price Signals for Environmental Design**
- **Pervious Concrete – Cold Weather Performance & Design**
- **Urban Forest Services**

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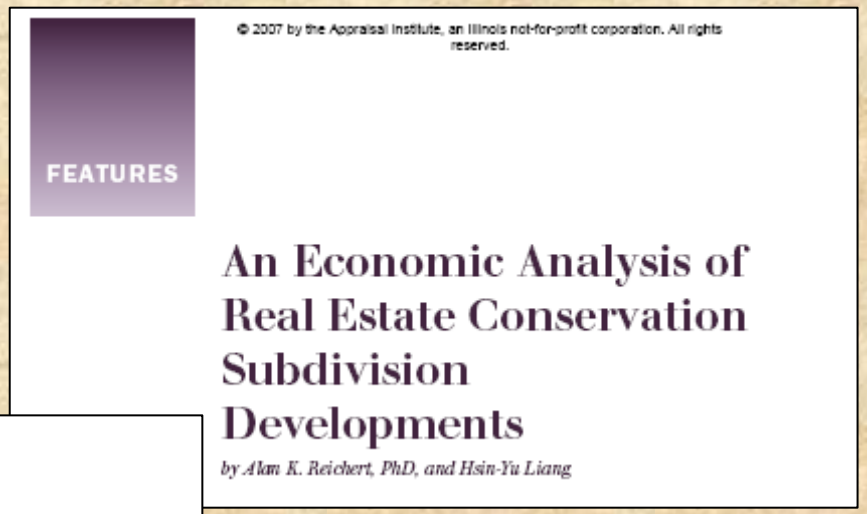
Economic Sustainability: Hedonic Price Analysis

Conservation Design

Riparian Setback Zoning

New Urbanism



Riparian Setbacks; Technical Information for Decision Makers

www.crwp.org/pdf_files/riparian_setback_paper_jan_2006.pdf

- **Local Governments Commission**
- **Colorado League of Women Voters**
- **Chesapeake Bay Local Government Information Network**
- **Community Forest Resource Center**
- **Mass. Dept Fish and Game**
- **Arizona NEMO (***Nonpoint Education for Municipal Officers***)**
- **New Hampshire Fish and Game Department**
- **Maryland DNR**
- **Connecticut Association of Conservation and Inland Wetland Commissions Inc.**
- **Wisconsin DNR**
- **Maine DEP**
- **Montana Water Course**
- **Westchester County, NY Department of Planning.**
- **Association of State Wetland Managers**

Cleveland's Urban Forest

Annual Air Quality Benefits ~$3 billion

- **Cuyahoga County Green Print**
- **Cleveland Metroparks**
- **City of Cleveland Street Trees**

"Train the Trainer"

D. Nowak, R. Pouyat
U.S. Forest Service
Northern Research Station

baltimoresun.com

On a mission to add to greenery

Volunteers armed with computers collect data on Baltimore's trees

By Alia Malik Sun reporter July 28, 2007

Sun photo by Mauricio Rubio, July 18, 2007

Hydrologic Services:

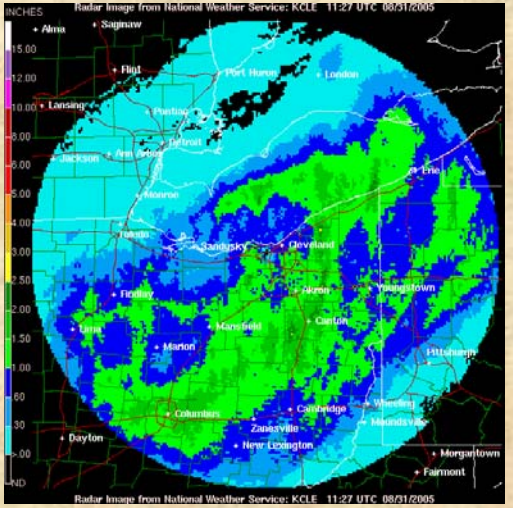
Cuyahoga Sustainability Network

Sustainable Landscapes & Pervious Concrete

Cleveland State University& Ohio Ready Mix Concrete Association

Cuyahoga Sustainability Network

Pervious Concrete Test Plot



Tropical Storm Katrina Storm Totals:

31Aug 2005 - 07:27 EDT

Cuyahoga Sustainability Network

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Hydrologic Services:
Quantifying Site Infiltration

IIHR Digital Infiltrometer Controller

Cuyahoga Sustainability Network

CRWP

LID Performance Monitoring

EPA National Community Decentralized Wastewater Demonstration Project

-Matt Morrison – EPA NRML

-USGS Ohio District

- **Rain garden: max water level**
- **Pervious pavement outflow**
- **Pervious pavement soil moisture (TDR nests)**
- **WQ: Temp & conductivity + TSS, TP, Cl, turbidity, total & dissolved metals**
- **Parking lot surface runoff: quantity and quality**

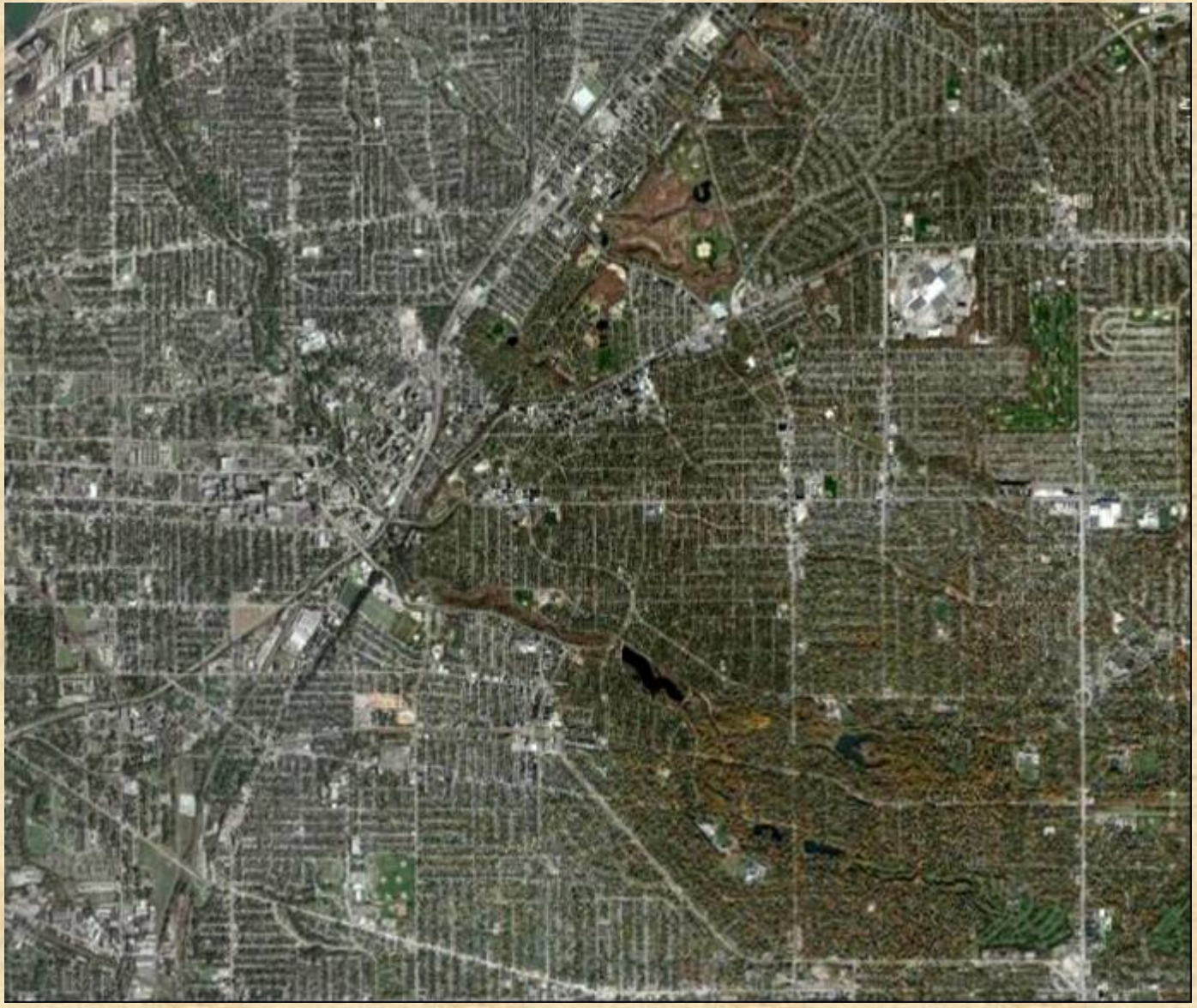
IR: 24.0 – 0.74 cm/hr

Cawrse & Associates — Chagrin River Watershed Partners

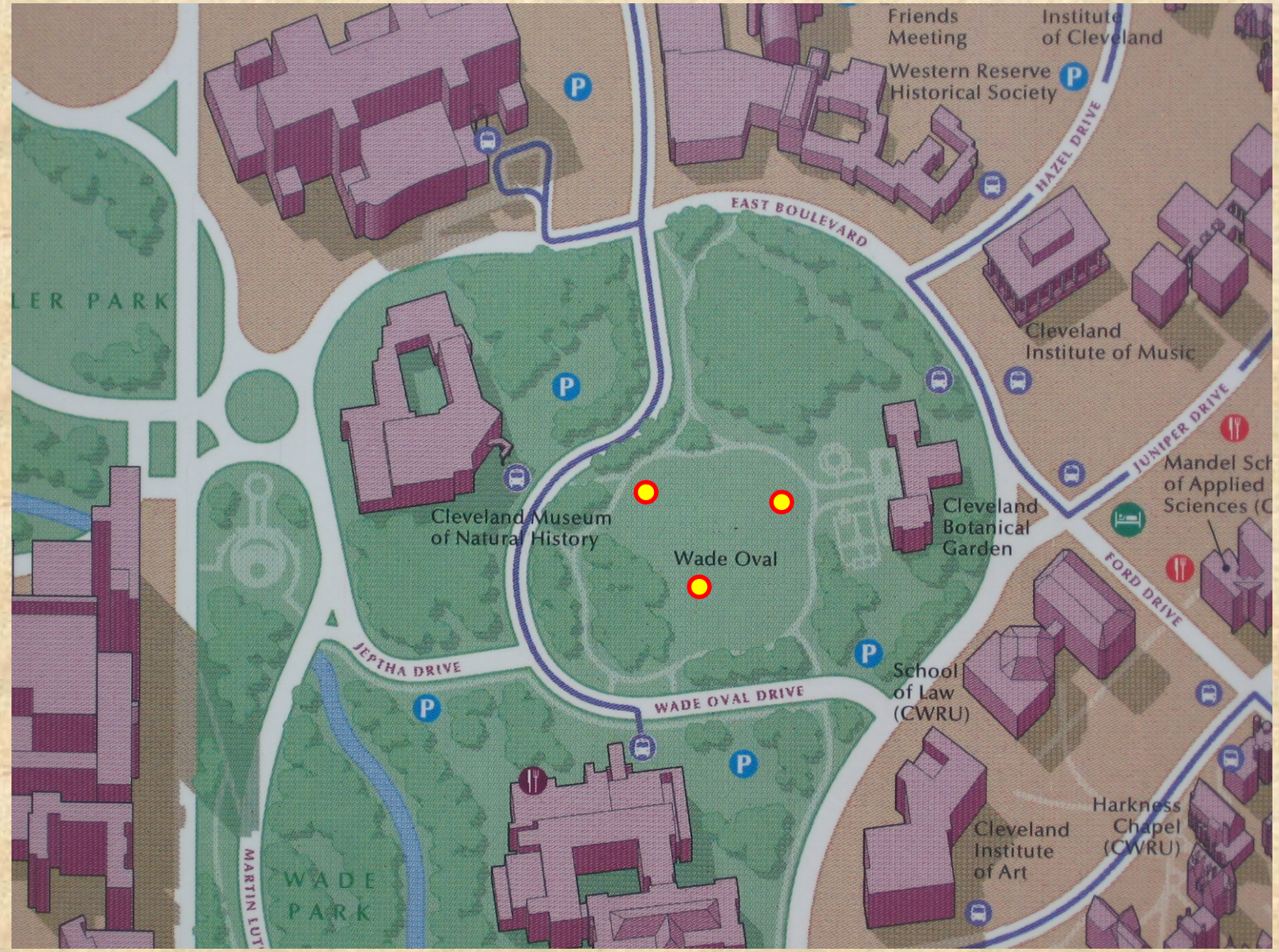
Suburbanization and Greenspace

Cuyahoga Sustainability Network

Ghosts of Land Use Past




© 2007 Sanborn
Google


Friends Meeting
Institute of Cleveland
Western Reserve Historical Society
HAZEL DRIVE
EAST BOULEVARD
LER PARK
Cleveland Institute of Music
JUNIPER DRIVE
Mandel Sch
of Applied
Sciences (C
Cleveland Museum of Natural History
Wade Oval
Cleveland Botanical Garden
FORD DRIVE
JEPTHA DRIVE
WADE OVAL DRIVE
School of Law (CWRU)
Harkness Chapel (CWRU)
Cleveland Institute of Art
WADE PARK
MARTIN LUT

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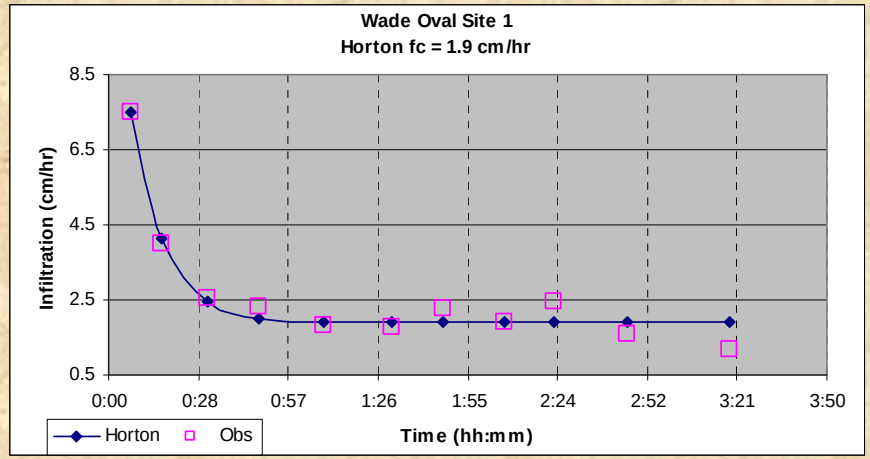
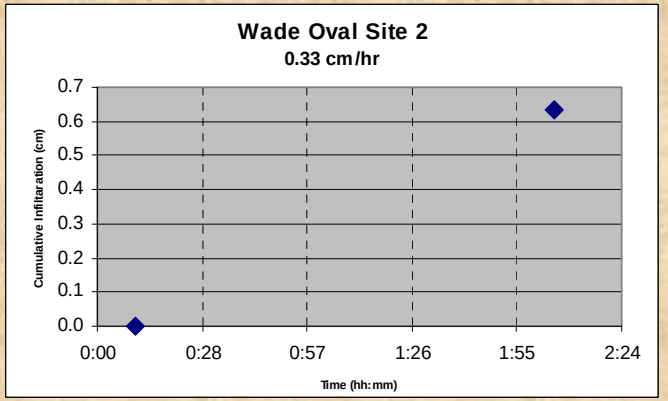
Wade Oval Infiltration

Wade Oval Infiltration

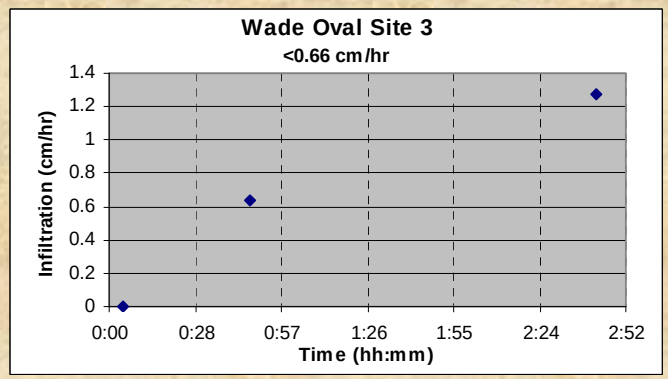
Cuyahoga Sustainability Network



1.8 cm / hr



0.33 cm / hr



< 0.3 cm / hr

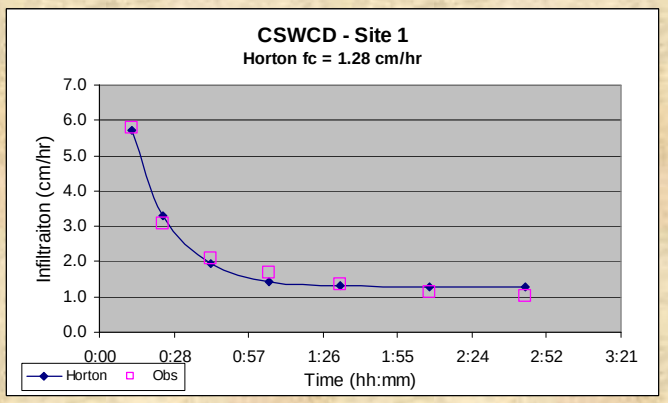
Beyond Impervious Area-

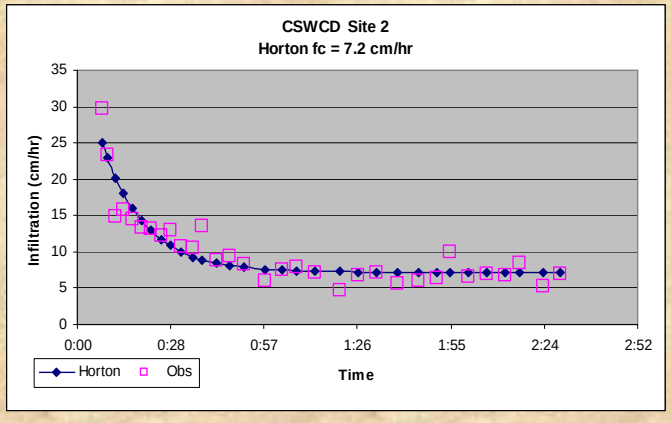
Rain Gardens - etc?

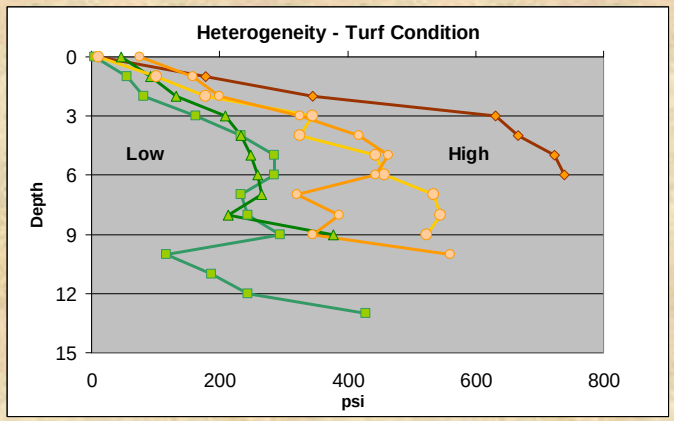
Cuyahoga Sustainability Network

CSWCD Rain Garden

Infiltration and Soil Compaction

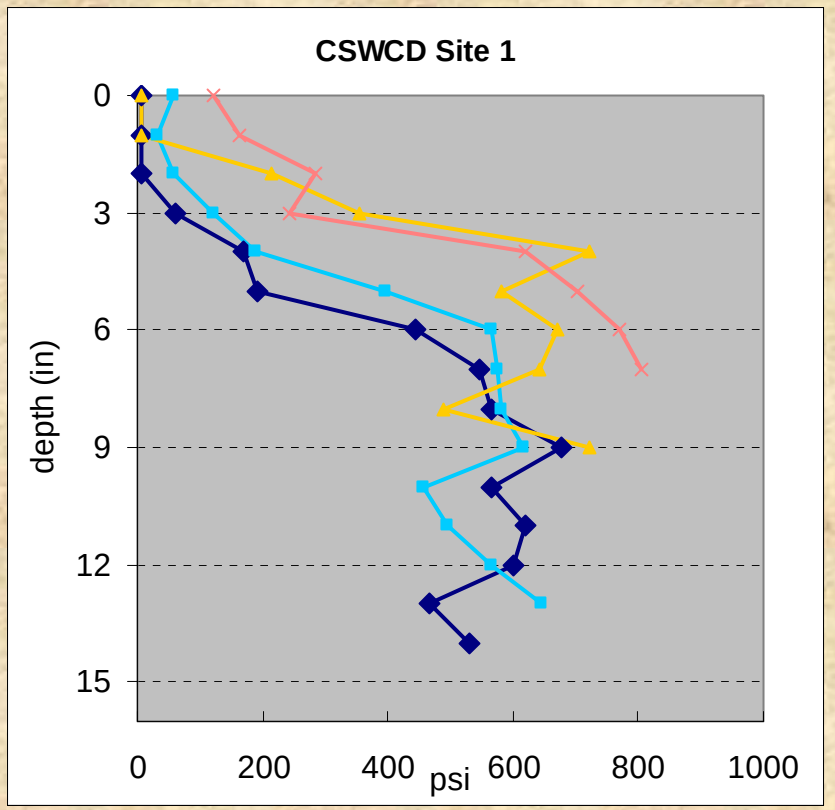


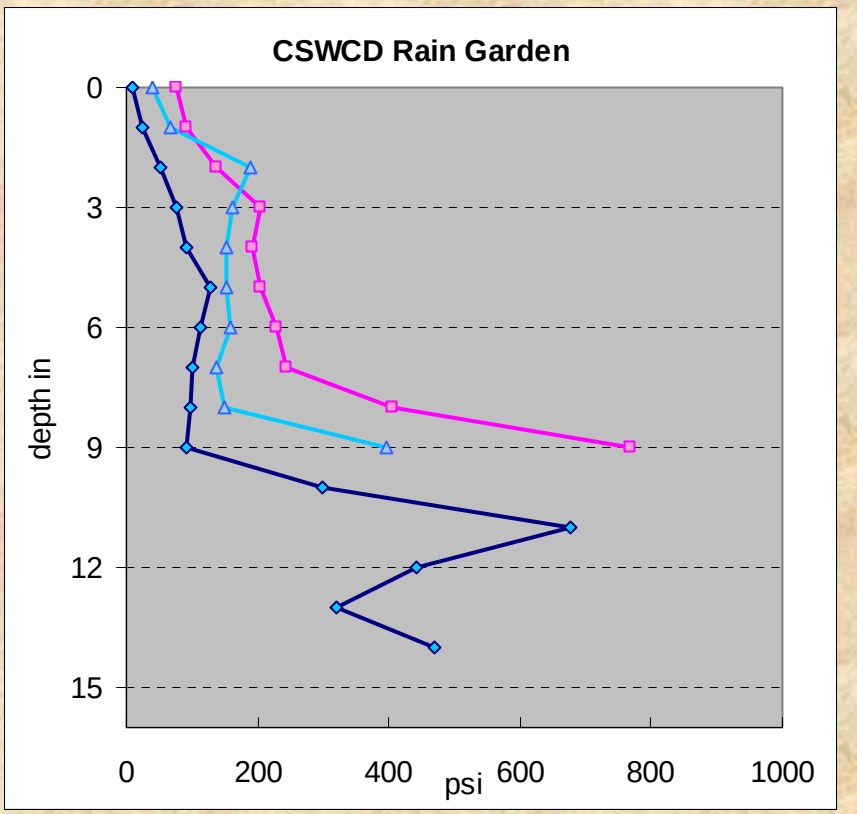




CSWCD Rain Garden

Infiltration and Soil Compaction






Heritage Development Company
Coming
City View Center
Spring 2005
WAL-MART
BED BATH & BEYOND
DICK'S
GIANT EAGLE
JOANN
Kohan Pavich
216-514-5100

“Engineered Topography”

Cuyahoga Sustainability Network

Cuyahoga Sustainability Network

No-Mow Lawns

Cleveland Botanical Garden

City of Cleveland

Cuyahoga Sustainability Network

No-Mow Lawns

Results from CNS Funding

Enabled New Collaborations & Technology Transfer:

-U.S. Forest Service Northern Research Station

Urban Forestry & Sustainable Landscapes

- Baltimore Ecosystem Study a NSF-LTER site

Urban Infiltration Studies –Cornell Infiltrometers

- Chesapeake Bay Trust – Pervious concrete Partnership with CSU, MD-SHA, County Engineers, MDE, MRMCA, MD-ASCE, MD-USGBC

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Collaborator Updates

- **CSU – Parker Hannifin Building – pervious concrete**
- **Chagrin River Watershed Partners – Cawrse Associates**
- **University Circle Corporation**
- **Cleveland Botanical Gardens – low-mow lawns**
- **City of Cleveland – Urban Street Trees**
- **Cuyahoga County Planning Commission – Greenprint**
- **Cuyahoga SWCD – compaction and lawn tillage**

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Future Work

- **Community Tree Survey in Cleveland**

- **Urban Forest Services:**
  Cuyahoga GreenPrint; Cleveland Metroparks; Cleveland Street Trees

- **Infiltration & Hydrologic Services:**
  Hydrologic function of rain gardens & urban pervious areas
  Lawn treatment for infiltration
  No-Mow lawns and lawn care – quality and function

- **Pervious concrete partnerships in Chesapeake Bay**

- **Spatial Decision Models – New Color & IR Aerials and LIDAR**

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Social Sustainability

Ghosts of Land Use Past

Euclid Golf:
Suburbanization & Greenspace

August 26, 1919

Dear Mr. Rockefeller:

… One of the most gratifying features of the enterprise is that real estate men look upon this Euclid Golf Allotment as a model development. Mr. Deming has had many visitors from all parts of the United States inspecting the place, and their universal comment has been that only "Mr. Rockefeller" could do such a fine piece of work. …

Very Truly,
Charles O. Hedyt

PA Lawns –

Pitt

Clavenger

Turf Amendment – Balousek 2003

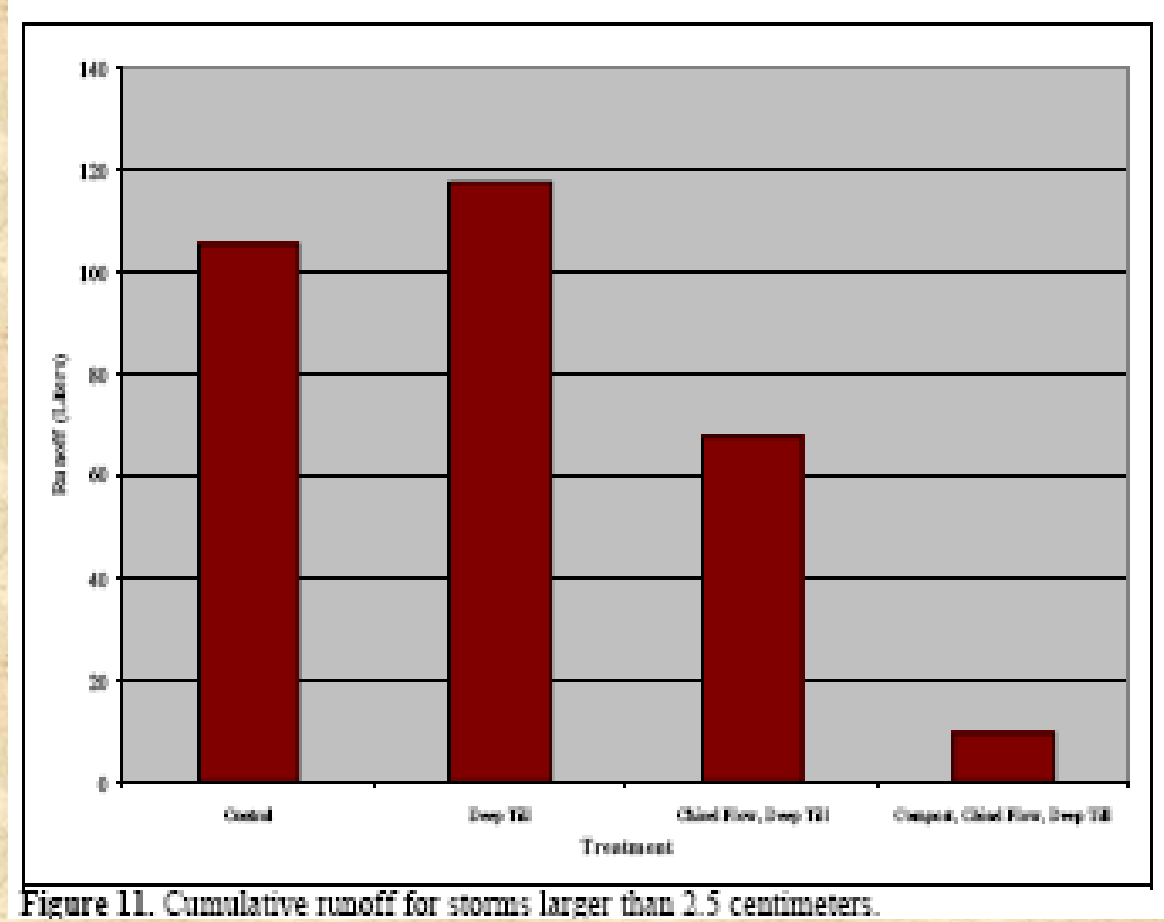

Figure 11. Cumulative runoff for storms larger than 2.5 centimeters.

Balousek 2003. "Quantifying Decreases in Stormwater Runoff from Deep Tilling, Chisel Plowing, and Compost Amendment."
http://www.countyofdane.com/landconservation/papers/quantifyingdecreasesinswrunoff.pdf

Feedback & Contacts

- Commoditizing Stormwater – Credits and Trading

- Automatically Derived Spatial (GIS/Remote Sensing) Metrics of Sustainable landscapes & design

- Landscape Influences on Hydroecology

- Urban BMP cost-effectiveness

- Riparian Setback / Riparian Buffer Technical Literature

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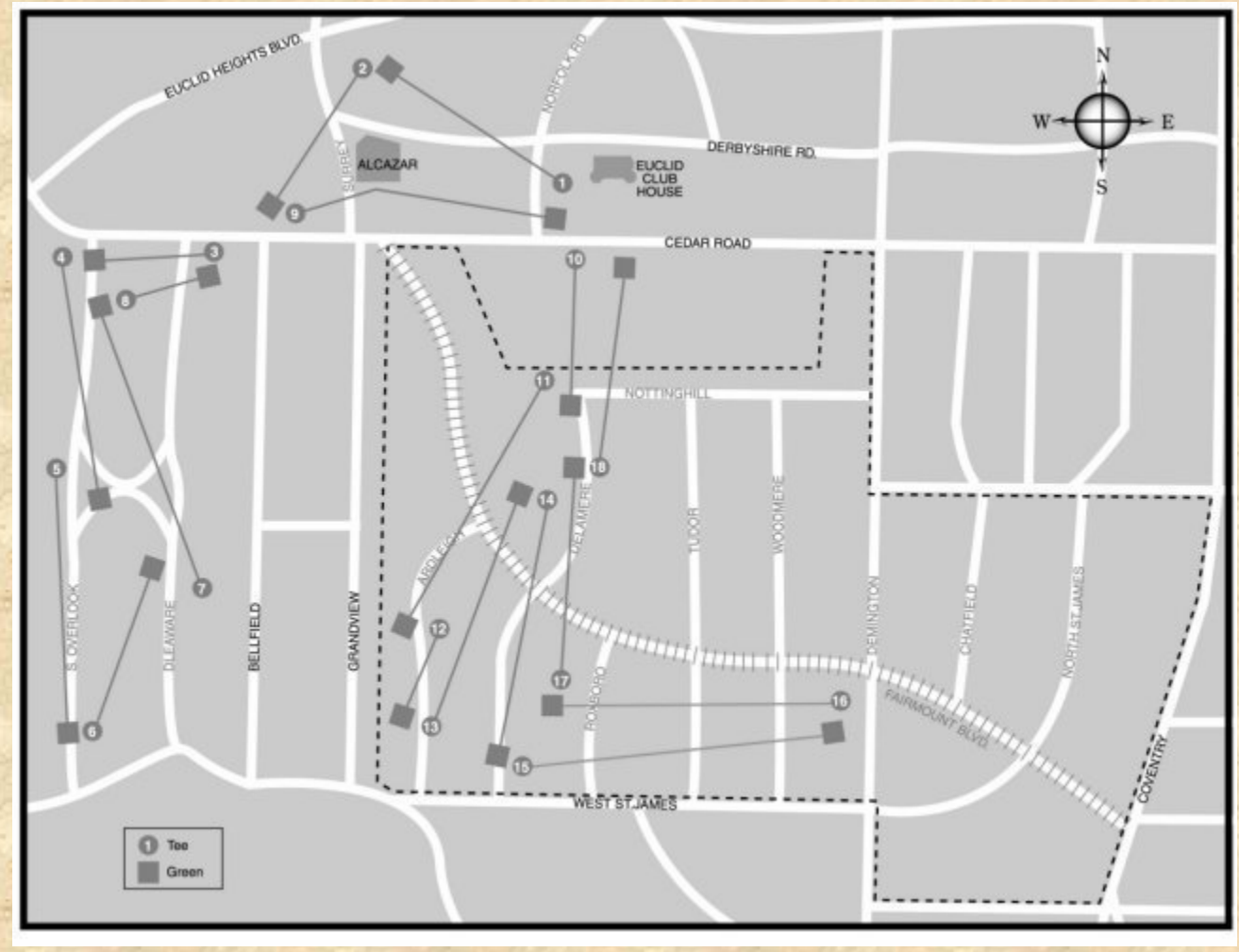
Euclid Golf

Cuyahoga Sustainability Network



Environmental Sustainability

Hydrologic Services & Sustainable Landscapes

- **Pervious Concrete**
- **Site Infiltration**
- **Lawns & Green Spaces**
- **Beyond Impervious Area**

Social Sustainability
Ghosts of Land Use Past

The Heights & Early Suburbanization

Rockefeller, Ambler, Wade

Euclid Golf

- **Deed Restrictions**
- **Euclidean Zoning**
- ***Euclid v. Ambler***

Shaker Nature Center and the Lee-Clark Freeway